

Lenticel Breakdown of Apples and Fruit Mineral Balance

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Fruit quality is strongly affected by fruit mineral content. Bitter pit is a good example of a disorder that develops when fruit minerals are out of balance. Fruit mineral content is not the only driver of bitter pit and researchers recommend a systems approach that includes moderate pruning, regulating fruit set, irrigation, nutrient sprays and harvest timing.

In our laboratory, we have been examining the role of postharvest factors in the expression of Lenticel Breakdown (LB) symptoms of apples for the past five years. For background on this disorder see the WSU Postharvest Information Network (<http://postharvest.tfrec.wsu.edu>).

It has become obvious that postharvest factors, although effective in mitigating LB symptoms are not the only factors and pre-harvest factors must also be considered. The risk of LB is very much orchard related; fruit from some orchards were very susceptible to LB while fruit from other orchards were not.

Like bitter pit, a systems approach is needed to lower the risk of LB. One step in reduction of LB is to obtain a balance of nutrients in the fruit. Our research over the last three years has shown that fruit that develop LB have fruit nutrient ratios that are out of balance.

Using the method described by Dr Eric Curry in [Factors Associated with Apple Lenticel Breakdown](#), we looked at the ratio of magnesium and potassium to calcium and nitrogen to calcium using the equation, $K+Mg/Ca + N/Ca$ in the peel of fruit with and without LB. We tested nutrients in the peel since LB is a superficial problem involving little of the flesh.

Fruit with a lower ratio had a lower incidence of LB and fruit with a higher ratio had a higher incidence of LB. Thus fruit with LB had high levels of nitrogen, potassium and magnesium and low levels of calcium. Because these ratios varied by orchard, strain and time of year, it is not possible to give a target value that will work for all orchards.

When Red Delicious was 'king' in Washington calcium was sprayed on the tree only three times during the growing season. It has become apparent that Gala (and possibly other 'new' varieties) need to have calcium applied more frequently to produce quality fruit. It is not unreasonable to suggest (from work done elsewhere) that 10 to 12 applications of a foliar calcium spray might be needed to balance the mineral content of Gala. The actual nutrient program needs to be determined on the basis of individual orchard.

Calcium is not the only nutrient implicated in determining risk of LB. Fruit nitrogen (as driven by crop load, pruning, and fertilizer) as well as magnesium and potassium levels are also implicated thus far. Tree and subsequently fruit mineral balance must be optimized to minimize the risk of LB. Growers should align their nutrient program to promote a balanced nutrient status in the fruit. It might not be too late to reduce the risk of LB in the 2009 crop. This can be a very important step in reducing the risk of LB.